

## **REMARKS**

Applicants amend claims 1, 2, 4 and 6. Claims 1-4 and 6 are currently pending, of which claims 1 and 6 are independent. No new matter has been introduced. Support for the claim amendments to claims 1 and 6 can be found in Applicants' original claims 2 and 4, Figures 1 and 3 and the portions of the Specification related thereto. Applicants respectfully submit that the pending claims are in condition for allowance.

### **I. Telephone Interviews with the Examiner**

Applicants note with appreciation the telephone interviews conducted with the Examiner on January 15, 2009 and January 22, 2009. The topic of the interview focused on the 35 U.S.C. §103(a) rejection of claim 1 over United States Patent Number 5,912,088 to Ernst (hereinafter "Ernst") in view of United States Patent Number 5,464,700 to Steck *et al.* (hereafter "Steck"). The subject matter of the claimed invention and the subject matter taught by Ernst reference were discussed. The Examiner appeared to indicate that further clarification of the recited first metal separator as illustrated in Figures 1 and 3 may overcome the rejection based the Ernst and Steck reference.

### **II. Claim Amendments**

In view of the interview with the Examiner, Applicants amend independent claims 1 and 6 to further clarify the structure of the recited first metal separator and the seal member, respectively. More specifically, claim 1 is amended to further define a first metal separator having a plurality of first inner surfaces contacting a cathode of the electrolyte electrode assembly, a plurality of second surfaces forming a portion of a coolant flow passage and a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode to distinguish each claimed invention from the Ernst and Steck reference combination. More specifically, claim 6 is amended to further define a recited seal member as including a seal member having a main seal with an outer boundary wholly interposed between and contacting the first metal separator and the electrolyte forming an air tight seal therebetween, and an inner portion interposed between and contacting the

first metal separator and a planar portion of the first gas diffusion layer forming an air tight seal therebetween to distinguish each claimed invention from the Ernst and Steck reference combination.

Applicants contend that the above claim amendments address the issues raised by the Examiner during the interview, and assert that the amendments further distinguish Applicants' claims from the Ernst and Steck reference combination, as will be explained below.

### **III. Rejection of Claims 1, 2 and 6 under 35 U.S.C. §103**

Claims 1, 2 and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst in view of Steck. Applicants respectfully traverse this rejection in view of the above amendments and the following arguments. For the ease of the discussion below, the respective claim sets are discussed separately.

### **IIIA. Rejection of Claims 1 and 2 under 35 U.S.C. §103**

Claims 1 and 2 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst in view of Steck. Applicants respectfully traverse this rejection in view of the above amendments and the following arguments.

Claim 2 depends upon independent claim 1, and therefore, incorporates the patentable features of claim 1.

Applicants respectfully submit that neither the Ernst reference nor the Steck reference, alone or in any reasonable combination does not disclose, teach or suggest at least the following feature of amended independent claim 1: "said first separator having a plurality of first inner surfaces contacting a cathode of said electrolyte electrode assembly, a plurality of second surfaces forming a portion of a coolant flow passage and a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode."

In the Office Action, the Examiner points to Figures 3 and 4 in the Ernst reference as teaching the seal member recited in claims 1 and 6. However, a review of the embodiments depicted in Figures 3 and 4 teaches an air gap exists between the gasket material 304 and the face 202 of flow field plate 200. Likewise, the Ernst reference teaches an air gap exists between the gasket material 304' and the face 202' of flow field plate 200'. As taught by the Ernst reference, the air gap between each piece of the gasket material and respective face of the flow field plates is problematic. More specifically, the Ernst reference deems the lack of gasket contact with the face of the flow field plate a problem that causes an undesirable electrochemical gradient generally between the outermost flow field channel 204 and an approximate location 314 located at the outer peripheral edge of the gas fusion layer 312.

To address the undesirable electrochemical gradient caused by the air gap between the face of a flow field plate and a respective gasket, Ernst teaches in Figure 4 and the corresponding text, an insulating material 406 and 406' disposed between the solid electrolyte 306 and the face 202 and 202' of flow field plates 200 and 200', respectively. As depicted in Figure 4, the isolating material 406 and 406', respectively, partially seal the air gap between the faces 202 and 202' of the flow field plates 200 and 200', respectively, to address undesirable electrochemical gradient generally between the outermost flow field channel 204 and an approximate location 314 located at the outer peripheral edge of the gas fusion layer 312. Nonetheless, even with the isolating material 406 and 406' in place, the air gap remains between the main seal portion 304 or 304' and the faces 202 and 202' of flow field plates 200 and 200', respectively.

The Steck reference teaches a fuel cell system that provides a seal between the electrically conductive separator plates. For example, a gasket layer 12 is interposed between the separator plates 22, 24. *See*, Figure 6 of the Steck reference. However, the Steck reference does not disclose, teach or suggest that the outer peripheral portion of the seal is wholly interposed between and contacting the first metal separator and the electrolyte.

In contrast to Ernst and Steck, alone or in combination, Applicants claim 1 recites, amongst other features, a first separator having a plurality of first inner surfaces contacting a cathode of said electrolyte electrode assembly, a plurality of second surfaces forming a portion of a coolant flow passage and a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode. Neither Ernst nor Steck disclose, teach or suggest such a feature. That is, Ernst does not disclose, teach or suggest a first metal separator having a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode. Likewise, Steck does not disclose, teach or suggest a first metal separator having a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode. Moreover, in a Response dated April 4, 2008 Applicants successfully persuaded the Examiner to withdraw a single reference 35 U.S.C. §103(a) rejection of pending claims 1, 2, and 6 in view of the Steck reference.

Hence, neither the Ernst reference nor the Steck reference, alone or in any combination, teach or suggest each and every element of claims 1 and 2.

In view of the foregoing amendments and arguments, Applicants respectfully submit that the combination of the Ernst reference in view of the Steck reference fails to establish a *prima facie case* of obviousness with which to reject claims 1 and 2. As such, Applicants respectfully submit that claims 1 and 2 define over the art of record.

Applicants respectfully request the Examiner to reconsider and withdraw the rejections of claims 1 and 2 under 35 U.S.C. §103(a).

**IIIB. Rejection of Claim 6 under 35 U.S.C. §103**

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ernst in view of Steck. Applicants respectfully traverse this rejection in view of the above amendments and the following arguments.

Applicants respectfully submit that neither the Ernst reference nor the Steck reference, alone or in any reasonable combination does not disclose, teach or suggest at least the following feature of amended independent claim 6: “a seal member having a main seal with an outer boundary wholly interposed between and contacting the first metal separator and the electrolyte forming an air tight seal therebetween, and an inner portion interposed between and contacting the first metal separator and a planar portion of the first gas diffusion layer forming an air tight seal therebetween.”

In the Office Action, the Examiner points to Figures 3 and 4 in the Ernst reference as teaching the seal member recited in claims 1 and 6. However, a review of the embodiments depicted in Figures 3 and 4 teaches an air gap exists between the gasket material 304 and the face 202 of flow field plate 200. Likewise, the Ernst reference teaches an air gap exists between the gasket material 304' and the face 202' of flow field plate 200'. As taught by the Ernst reference, the air gap between each piece of the gasket material and respective face of the flow field plates is problematic. More specifically, the Ernst reference deems the lack of gasket contact with the face of the flow field plate a problem that causes an undesirable electrochemical gradient generally between the outermost flow field channel 204 and an approximate location 314 located at the outer peripheral edge of the gas fusion layer 312.

To address the undesirable electrochemical gradient caused by the air gap between the face of a flow field plate and a respective gasket, Ernst teaches in Figure 4 and the corresponding text, an insulating material 406 and 406' disposed between the solid electrolyte 306 and the face 202 and 202' of flow field plates 200 and 200', respectively. As depicted in Figure 4, the isolating material 406 and 406', respectively, partially seal the air gap between the faces 202 and 202' of the flow field plates 200 and

200', respectively, to address undesirable electrochemical gradient generally between the outermost flow field channel 204 and an approximate location 314 located at the outer peripheral edge of the gas fusion layer 312. Nonetheless, even with the isolating material 406 and 406' in place, the air gap remains between the main seal portion 304 or 304' and the faces 202 and 202' of flow field plates 200 and 200', respectively. As taught by the Ernst reference, the isolating material 406 and 406' is merely a coating having an approximate thickness of 0.0005 to 0.0020 in. *See*, Ernst column 8, lines 19-21. Hence, an airtight seal is not formed between the main seal portion 304 or 304' and the faces 202 and 202' of flow field plates 200 and 200', respectively as the gas is still permitted to enter the undesirable area, but not contact the metal plate in order to prevent corrosion.

The Steck reference teaches a fuel cell system that provides a seal between the electrically conductive separator plates. For example, a gasket layer 12 is interposed between the separator plates 22, 24. *See*, Figure 6 of the Steck reference. However, the Steck reference does not disclose, teach or suggest that the outer peripheral portion of the seal is wholly interposed between and contacting the first metal separator and the electrolyte.

In contrast to Ernst and Steck, alone or in combination, Applicants claim 6 recites, amongst other features, a seal member having a main seal with an outer boundary wholly interposed between and contacting the first metal separator and the electrolyte forming an air tight seal therebetween, and an inner portion interposed between and contacting the first metal separator and a planar portion of the first gas diffusion layer forming an air tight seal therebetween. Neither Ernst nor Steck disclose, teach or suggest such a feature. That is, Ernst does not disclose, teach or suggest an *airtight seal* between the first metal separator and the electrolyte, nor does Ernst disclose, teach or suggest an *airtight seal* between the first metal separator and a planar portion of the first gas diffusion layer. Likewise, Steck does not disclose, teach or suggest a seal member as recited in claim 6. Moreover, in a Response dated April 4, 2008 Applicants successfully persuaded the Examiner to withdraw a single reference 35 U.S.C. §103(a) rejection of pending claims 1, 2, and 6 in view of the Steck reference.

Hence, neither the Ernst reference nor the Steck reference, alone or in any combination, teach or suggest each and every element of claim 6.

In view of the foregoing amendments and arguments, Applicants respectfully submit that the combination of the Ernst reference in view of the Steck reference fails to establish a *prima facie case* of obviousness with which to reject claim 6. As such, Applicants respectfully submit that claim 6 defines over the art of record.

Applicants respectfully request the Examiner to reconsider and withdraw the rejection of claim 6 under 35 U.S.C. §103(a).

#### **IV. Rejection of Claims 3 and 4 under 35 U.S.C. §103**

Claims 3 and 4 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Ernst reference in view of the Steck reference and in further view of United States Patent Publication Number 2002/0119358 to Rock (hereafter “Rock”). Applicants respectfully traverse this rejection in view of the foregoing amendments and the following arguments.

Claims 3 and 4 depend, directly or indirectly, upon independent claim 1, and therefore, incorporate the patentable features of claim 1.

Applicants respectfully submit that the Ernst, Steck and Rock references, alone or in any combination, fail to teach or suggest at least the following feature of amended independent claim 1: “a first separator having a plurality of first inner surfaces contacting a cathode of said electrolyte electrode assembly, a plurality of second surfaces forming a portion of a coolant flow passage and a third substantially flat outermost peripheral surface offset from the cathode in a stacking direction of the fuel cell by a distance and extending outwardly from an outermost one of a reactant gas flow field beyond an outer region of the cathode.”

The Rock reference teaches a fuel cell system that has seal members in contact with a membrane of an MEA and a bipolar plate. *See* Rock, Figures 10-14. For example, seal 108 and seal 105 are in contact with the membrane of MEA 106 and bipolar plate 104 or bipolar plate 110. There is no teaching or suggestion in the Rock reference that the seal would have a portion that is sandwiched between a gas diffusion layer and a separator, analogous to the flow field wall recited by claim 1. Accordingly, the Rock reference does not teach or suggest that a side of said flow field wall, said outer region of said other gas diffusion layer, and said first metal separator define an outermost one of said reactant gas flow fields, as recited in claim 1.

Hence, the Rock reference fails to bridge the factual deficiencies of the combination of the Ernst reference in view of the Steck reference.

In view of the foregoing arguments, Applicants respectfully submit that the Ernst, Steck and Rock references, alone or in any combination, fail to teach or suggest each and every feature of claims 3 and 4. As such, Applicants respectfully submit that claims 3 and 4 define over the art of record.

Applicants respectfully request the Examiner to reconsider and withdraw the rejections of claims 3 and 4 under 35 U.S.C. §103(a).



**CONCLUSION**

In view of the remarks set forth above, Applicants contend that Claims 1-4 and 6, presently pending in this application, are patentable, and in condition for allowance. If the Examiner deems there are any remaining issues, we invite the Examiner to call the undersigned at (617) 227-7400.

If any additional fee is due with this statement, please charge our Deposit Account No. 12-0080, under Order No. TOW-041RCE2, from which the undersigned is authorized to draw.

Dated: March 3, 2009

Respectfully submitted,

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